

A REVISION OF THE GENUS *RHYSOPHORA* CRESSON  
WITH A KEY TO RELATED GENERA  
(DIPTERA: EPHYDRIDAE)

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*Abstract.*—Mathis, W. N., Department of Entomology, Smithsonian Institution, Washington, D.C. 20560.—The genus *Rhysophora* includes three species of New World Psilopinae. The species are described, illustrated, and their distributions mapped. Two species are newly described: *R. liropus* (type-locality, Campana, Argentina); and *R. ardeoceras* (type-locality, 14 km NE Tilaran, Costa Rica). The species are divided into two species-groups and the species, generic, and tribal relationships are discussed.

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Introduction and Review

Shore flies of the New World genus *Rhysophora* Cresson are poorly known. Apart from Cresson's original description of the genus (1924), fewer than a dozen references mention the genus and many of these are catalogue entries (Wirth, 1965, 1968) or keys to the genus in faunistic studies of the family (Sturtevant and Wheeler, 1954; Wirth and Stone, 1956). Cresson (1942) reviewed *Rhysophora* as part of his synoptic series of North American Ephydridae and gave new distributional data for the then monotypic species, *R. robusta* Cresson. Four years later, Cresson (1946a) published a synopsis of Neotropical Psilopinae in which two species described by Loew (1862), *Psilopa umbrosa* and *P. caeruleiventris*, were transferred to *Rhysophora*. Both of Loew's species were included as members of *Rhysophora* in Wirth's study of the ephydrid fauna of the Bahama Islands (1956) and in his catalogue of South American Ephydridae (1968). Recently, however, Mathis and Wirth (1977) erected a new genus, *Nesopsilopa*, based on Loew's *umbrosa* and also including Loew's *caeruleiventris*.

Adults of *Rhysophora* are collected infrequently, resulting in a paucity of available specimens. Moreover, virtually nothing has been discovered with regard to the immature stages, behavior, or natural history of *Rhysophora* members.

The purpose of the present study is to revise the species, two of which are new, to comment on their phylogeny and classification, and to provide a basis and hopefully the stimulus for further study of their natural history.

Methods

Ratios have been used objectively to define several characters: Frons width-to-length ratio is the frons length divided by frons width, where

the length is the distance between the posterior ocelli and the dorsal margin of the frontal suture and the width is the distance between the inner eye margins at the level of the median ocellus. Face height-to-width ratio is the face width divided by the face length, where the narrowest distance between the eyes below the antennae is the face width measurement and the shortest distance between the dorsal frontal suture and the ventral edge of the face is the length measurement. Eye height-to-width ratio is the eye width divided by eye height, where both measurements are the greatest distances taken from a lateral aspect of the eye. Eye-to-cheek ratio is the height of the gena measured at the same point as the maximum eye height divided by the eye height. Wing length-to-width ratio is the maximum wing width divided by the wing length, where the length is the maximum distance between the base of the second basal cell and the apex of the wing. Costal vein index is the straight line distance along the costa between  $R_{2+3}$  and  $R_{4+5}$  divided by the distance between  $R_1$  and  $R_{2+3}$ .  $M_{1+2}$  vein index is the distance along the medius basad to  $tp$  (posterior crossvein) divided by the distance apicad of  $tp$ . Anal wing angle ratio is the maximum distance between vein  $M_{3+4}$  and the anal wing margin measured perpendicular to  $M_{3+4}$  divided by the distance along vein  $M_{3+4}$  between the base of the second basal cell and the junction of  $tp$ .

### *Rhysophora* Cresson

*Rhysophora* Cresson, 1924:159. Type-species.—*Rhysophora robusta* Cresson, by monotypy.

*Diagnosis*.—Members of *Rhysophora* are distinguished from those of related Psilopine genera by the following combination of characters: Length of outer vertical bristle half or less that of inner vertical; 1 pair of prescutellar bristles, these well developed, widely separated, and inserted anterior of alignment of intra-alar bristles; supra-alar bristle well developed; 2–4 facial setae in vertical row on lower half near parafacies; hind basitarsus of male swollen, bearing a row of fringelike, palewhite, small but distinctive setae along the anteroventral margin.

*Description*.—Moderately-small to moderately-large shore flies, length 2.68–4.25 mm; generally unicolorous, grayish brown to blackish brown.

*Head*.—Frons subquadrate; width to length ratio variable but wider than long; anterior margin of frons broadly concave to nearly flat; parafrons microvestiture dull, semivelvety; mesofrons generally triangular in shape but varying with species, usually extending to anterior margin, concolorous and similar in texture with fronto-orbits, these generally shinier and with more matted appearance; ocelli arranged in isosceles or equilateral triangle; if isosceles, distance between posterior pair longer; ocelli raised very slightly in relief from general level of frons. Chaetotaxy of

frons as follows: 1 pair each of inner and outer vertical bristles; length of inner bristle at least twice that of outer vertical, inserted mediad of latter; distance between inner and outer bristles very short, subequal to or less than distance between ocelli; 1 pair of large, proclinate, slightly divergent ocellar bristles, these inserted anterior to and slightly laterad of posterior ocelli; 2 pairs of postocellar bristles; anterior pair minute, inconspicuous, sometimes lacking, each inserted anterior and mediad of posterior ocelli; posterior pair of postocellars much larger, approximately half length of ocellar bristles, distinctly divergent, inserted between posterior pair of ocelli or slightly posterior, insertions close together; 2 pairs of conspicuous fronto-orbital setae, 1 anterior proclinate seta and 1 larger, reclinate seta; sometimes with a second, minute, proclinate seta with insertion aligned between larger proclinate and reclinate setae from lateral aspect; larger reclinate seta as large or larger than outer vertical seta and usually inserted slightly mediad of alignment of proclinate setae. Antennal shape variable; second segment setulose, especially on medial and ventral surfaces; one seta conspicuously large, stout, spinelike, inserted toward anterodorsal corner of second segment; 4-5 longer setae inserted ventrally on second segment; third segment broadly of acutely rounded apically; arista inserted near dorsal base of third segment, pectinate with 8-14 long, dorsal branches. Facial dimensions higher than wide, unicolorous; antennal fovea variable, if evident, distinctiveness of impressions varying and with vertical, interfoveal carina; lower portion of face becoming explanate ventrally to varying degrees, bearing 2-4 larger setae toward lateral margins, setae inserted in vertical row on each side paralleling parafacies; ventral margin of face level with remainder of epistoma or broadly emarginate with concavity tending to be angulate, clypeus sometimes exposed. Eye bare, higher than wide, broadly oval; eye-to-check ratio usually less than 1:0.25. Genal height varying with species, gena generally concolorous with or slightly duller than face, setulose and with 1 larger anteroclinate seta. Mouthparts generally small and withdrawn into oral cavity; prementum sclerite subquadrate to subrectangular, creased along vertical median, lightly pollinose.

*Thorax*.—Generally unicolorous, lacking pronounced coloration features. Scutellum subtrapazoidal, dorsal surface very slightly convex and setulose. Chaetotaxy as follows: lacking acrostichal and dorsocentral bristles except for a larger pair of prescutellar acrostichal setae, insertions of the latter widely separated and aligned anterior of intra-alar bristles; 1 pair of humeral bristles; 1 pair of presutural bristles; 1 pair of intra-alar bristles; 1 pair of supra-alar bristles; 1 pair of postalar bristles; 2 pairs of lateral scutellar bristles; anterodorsal setae of scutellum weakly developed; 2 pairs of notopleural bristles, each equidistant from ventral notopleural crease, otherwise notopleuron bare; 1 pair of larger, mesopleural bristles along pos-



terior margin but also with 1 other conspicuous, larger, seta dorsad of larger bristle, mesopleuron setulose, especially toward posterior margin, surrounding larger bristles; 1 pair of sternopleural bristles inserted toward posterodorsal corner plus a few scattered, smaller setae; 1 pair of larger, basicoxal bristles; up-curved, stigmal seta much reduced or lacking; other pleural areas bare. Legs generally lacking conspicuous macrosetae, except for 1 larger bristle inserted on anterior surface of mid femur at about apical one-third; hind basitarsus of male swollen, bearing fringlike row of small but conspicuous, pale-white, ciliate setae along anteroventral surface. Wing very slightly infumated, usually light, yellowish brown; costa extending to vein  $M_{1+2}$ ; costal index about 1:05;  $M_{1+2}$  index about 1:1; vein  $R_{2+3}$  basad of anterior crossvein bare above. Halter pale yellow.

*Abdomen.*—Generally unicolorous, lacking conspicuous coloration features, although posterior segments of some specimens with semifasciated, darker areas toward anterior margin of each, when evident, these fascia bisected by median grayish area; dorsal surfaces uniformly setulose, posterior and lateral margins of each segment with larger setae, this becoming more pronounced in posterior segments; fifth and sometime fourth segments with larger, marginal setae angulate orientation to surface; female with 6-7 segments visible, male with 5; length of segments in female subequal; segments of male becoming slightly larger posteriorly, 5th segment nearly as long as wide. Female postabdomen composed of complete segments 6-8, a narrow, slightly angulate ninth sternum, and paired cerci; sixth spiracle in ventral portion of sixth tergum. Male postabdomen symmetrical; epandrium broadly ovate from posterior view, open ventrally; cerci with median flange projecting posteriorly, ventrolateral margins blending gradually with cercal cavity membrane; surstyli robust, prominent, usually with a large anterior process bearing few, scattered, minute setae, posterior portion elbowed (best seen in posterior view), bearing large, conspicuous bristles, apex clothed with short, stout, spinules; aedeagal apodeme roughly triangular shaped in profile, attached anteriorly to broad, relatively flat, sheathing hypandrium; aedeagus varying considerably with species.

*Geographic distribution.*—The composite range of the included species extends along the eastern coast of the Western Hemisphere from 46° north latitude in Canada southward to 35° south latitude in Argentina. None of the species are known to occur sympatrically.

*Natural history.*—Members of *Rhysophora*, like most shore flies, are associated with aquatic or semiaquatic habitats, particularly where emergent vegetation is abundant. The *robusta* group appears to have a close association with plants of the family Pontederiaceae.

*Variation.*—Sexual dimorphism is evident in the shape and setation of the hind basitarsus. This structure in male specimens is enlarged, appearing swollen, and bears a row of fine, ciliate, pale setae which are in-



served in a depression along the ventral surface. In females, the hind basitarsus is similar to that of the fore or mid legs and lacks the row of fine setae. The function of the row of setae in males is unknown.

*Discussion.*—The generic concept of *Rhysophora* has undergone some modification since the initial description of the genus by Cresson (1924). As originally conceived, *Rhysophora* was monotypic and remained so for over 20 years until Cresson (1946) transferred two Neotropical species, *Psilopa umbrosa* Loew and *P. caeruleiventris* Loew, to the genus. Cresson (1946: 152) stated that this action might be unsatisfactory and that these two species “. . . may prove to be entitled to separate generic recognition allied to the Oriental *Actocetor*.” In a recent study of these taxa, Mathis and Wirth (1977) erected the genus *Nesopsilopa* for Loew's two species in addition to three new species. This action again left *Rhysophora* as a monotypic genus; the description of two new species here increases the number of species in the genus to its former size.

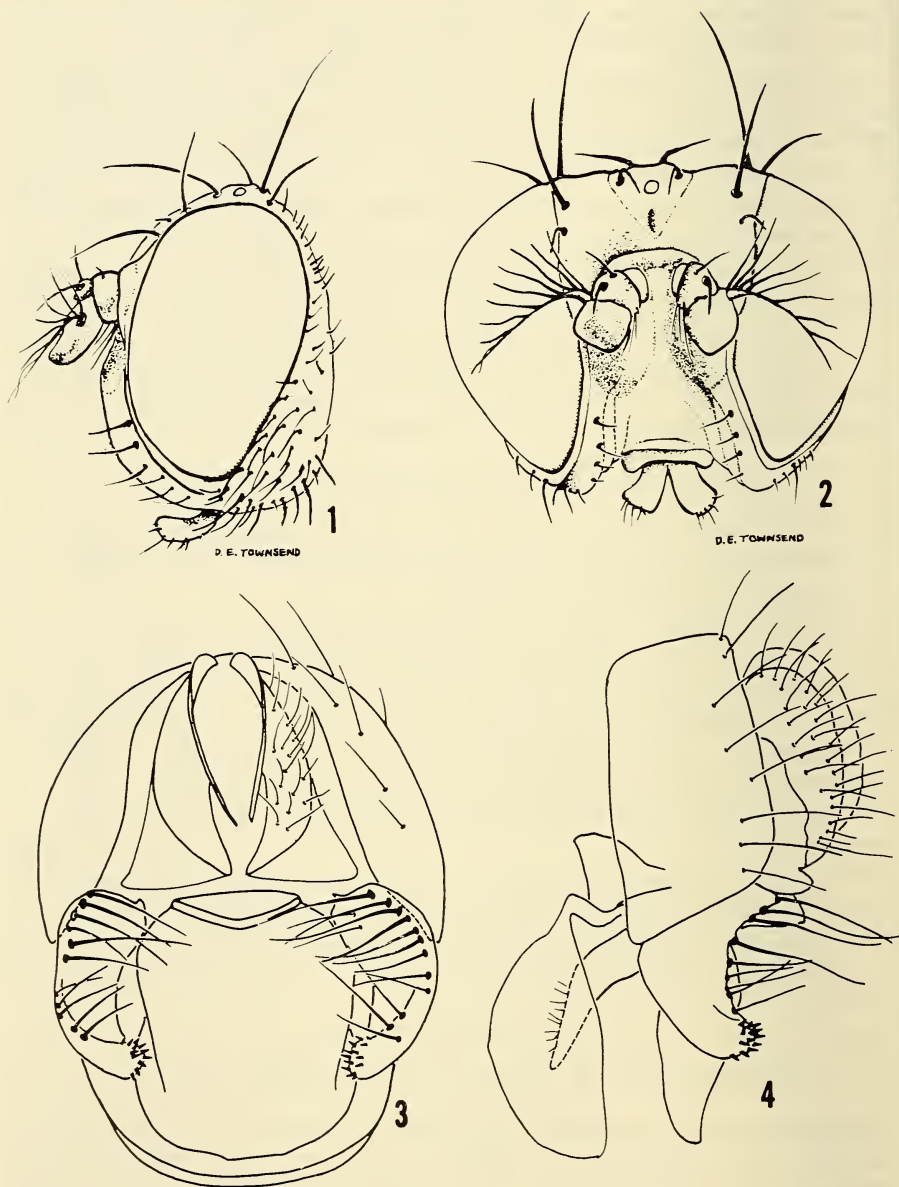
#### Key to Species-groups and Species of *Rhysophora*

1. Ventral margin of face broadly emarginate; antennal fovea distinct; third antennal segment only slightly longer than wide, broadly rounded apically (the *robusta* group) 2
  - Ventral margin of face level, lacking emargination; antennal fovea indistinct or lacking; third antennal segment much longer than wide, acutely rounded apically (the *ardeoceras* group) *R. ardeoceras*, n. sp.
2. General coloration black; third antennal segment entirely black; antennal fovea deeply impressed with rather sharply defined, vertical interfoveal carina; 3–4 pairs of larger facial setae; basitarsi of male black, mid and hind basitarsi of female pale, fore basitarsus mostly black *R. robusta* Cresson
  - General coloration grayish brown; basal two-thirds of third antennal segment pale, yellowish-orange; antennal fovea inconspicuous, lacking sharply defined, vertical, interfoveal carina; 2 pairs of larger, facial setae; basitarsi yellowish orange *R. liropus*, n. sp.

#### The *Robusta* Group

Included Species: *R. robusta* Cresson; *R. liropus*, new species

*Diagnosis.*—Frons width-to-length ratio 1:0.65 or less; length of outer vertical bristle approximately half that of larger, inner vertical; second antennal segment with largest setae not much longer than greatest width of segment; third antennal segment nearly as wide as long, dorsal and ventral surface parallel, apex broadly rounded; arisal branches numbering 8–10; antennal fovea distinct, making a vertical, interfoveal carina evident; ventral margin of face broadly emarginate; larger facial setae number-



Figs. 1-4. *Rhyssophora robusta*: 1. Head, lateral view; 2. Same, frontal view; 3. Male genitalia, caudal view; 4. Same, lateral view.

ing 3-4, arranged in vertical row near and paralleling parafacies; vein  $R_1$  merging with costa beyond level of anterior crossvein; anal wing angle more or less projecting; posterior marginal setae of fourth abdominal segment lying flat, those along fifth segment with slight angulate orientation; fourth abdominal sternum of male whole; and aedeagus flat in lateral aspect, rectangular from posterior aspect, symmetrical.

*Geographic distribution.*—Species of this group range along the Atlantic coast of North and South America.

*Natural history.*—Members of both species of this group are frequently associated with plant species of the family Pontederiaceae.

*Rhysophora robusta* Cresson

Figs. 1-9, 18

*Rhysophora robusta* Cresson, 1924:159; 1942:123 (review).—Sturtevant and Wheeler, 1954:160 (key to genus).—Wirth and Stone, 1956:465 (key to genus).—Wirth, 1965:743 (catalogue).

*Discocerina magna* Coquillett, in Johnson, 1910:806. Nomen nudum. by Wirth, 1965:743.

*Diagnosis.*—This species is closely allied with *R. liropus*, a new species from Argentina, but separable therefrom as outlined in the key.

*Description.*—Medium-sized to moderately large shore flies, length 3.26-4.16 mm; generally dark colored, blackish.

*Head* (Figs. 1, 2).—Frons width-to-length ratio averaging 1:0.56, black; parafrons velvety; mesofrons and fronto-orbit similar in texture, shiny; anterior apex of mesofrons triangular, acute, reaching anterior margin of frons; ocelli arranged in isosceles triangle, distance between posterior pair longer than distance between median and either posterior ocellus; larger postocellar setae conspicuous, at least half length of ocellar bristle; insertions of postocellars between posterior ocelli; outer vertical bristle subequal in length to reclinate fronto-orbital; posterior fronto-orbital seta inserted nearer to larger, reclinate fronto-orbital bristle than to anterior, small; proclinate bristle larger; fronto-orbit narrow, approximately equal to distance between median ocellus and either posterior ocellus. Antenna black; third segment equal to or shorter than combined length of first 2 segments. Face height-to-width ratio averaging 1:0.76, black, similar in texture to area surrounding ocellar triangle; antennal fovea deeply impressed with more sharply defined interfoveal carina; lower portion of face slightly receding, explanate medially, becoming rugose laterally; bearing 3, sometimes 4 lateral bristles in a row paralleling parafacies and slightly more than parafacial width from parafacial crease; ventral margin broadly emarginate, more or less evenly concave, sometimes slightly angulate; parafacial width narrow, remaining so until reaching ventral margin of eye.





Figs. 5-7. *Rhyssophora robusta*: 5. Hind basitarsus of male, lateral view; 6. Same, ventral view; 7. Same, close-up.

Eye height-to-width ratio averaging 1:0.65; gena short, eye-to-cheek ratio averaging 1:0.11, slightly more pollinose than face; maxillary palp black.

*Thorax*.—Generally unicolorous, black; mesonotum shinier anteriorly, becoming more densely pollinose, lacteous toward mesoscutum and scutellum; lacking any indication of vittae; scutellum setulose on posterior half, lateral margins with 3-4 setae in addition to larger bristles. Mesopleural area black, pteropleuron and hypopleuron more pollinose than anterior pleural areas. Femur, tibia, and fore tarsomeres concolorous, black; mid and hind tarsomeres of female pale, mostly yellow; mid and hind tarsomeres of male black, occasionally with some pale coloration on ventral surface. Hind basitarsus of male with ventral, longitudinal depression from which a distinctive row of flattened, recurved setae arise; depression with smaller setae between anterior margin of depression and insertions of larger setae, area between setal insertions and posterior margin bare (Figs. 5-7). Wing (Fig. 18) tinges with yellowish coloration, lacking pattern; wing length-to-width ratio averaging 1:0.47; costal vein index averaging 1:0.60;  $M_{1+2}$  vein index averaging 1:0.94; and wing angle ratio averaging 1:0.34.

*Abdomen*.—Coloration black, subshiny to shiny. Basal width of eighth sternum of female (Fig. 9) more than 3 times its length. Male postabdomen (Figs. 3, 4) smaller in size than that of *R. liropus*; surstylus less robust and larger bristles seen in posterior view not too much larger than dorsal, epandrial setae, anterior lobe flatter in profile; aedeagus broad, almost as wide as long, ventral margin lacking any prominent process.

*Type-material*.—Holotype male, labelled: "Dyke Va, July 16 (19)16; Flowers of *Pontederia cordata*; WLMcAtee, Collector; 891; Type No. 56453, U.S.N.M. (red); Holo-TYPE ♂, DISCOCERINA MAGNA, E. T. Cresson Jr (purple); Described as: *Rhysophora robusta* Cresson (hand written)." Allotype female with same label data as holotype except "Allo-TYPE ♀, Discocerina MAGNA, ETCressonJr (pink)." Cresson's original description lists an additional female paratopotype (ANSP), and the date cited is July 16, 1915 rather than July 16, 1916 as on the label.

*Specimens examined*.—CANADA: Ontario: 3♂♂, Ottawa, 1 July 1938, A. L. Melander (USNM). Quebec: 2♂♂, 3♀♀, Algonquin Park, 28 July 1922, J. McDunnough (CNC); 1♂, 1♀, Lac Bernard, 7 August 1938, G. E. Shewell (CNC); 3♂♂, 4♀♀, Perkins Mills, 14 August 1938, G. E. Shewell (CNC); 37♂♂, 39♀♀, St. Pierre de Wakefield, 28 July 1961, J. R. Vockeroth (CNC). UNITED STATES: Connecticut: Fairfield Co., 2♂♂, 2♀♀, Redding, 23 July 1930 and 16 July 1932, A. L. Melander (USNM). District of Columbia: 1♀, Anolostan Island [Theodore Roosevelt Island], Little River, 15 July 1916, H. L. Viereck (USNM). Florida: Dade Co., 1♂, Royal Palu Park, 12-18 April 1923, F 4671D (AMNH); Highlands Co., 1♀, Highlands Hammock State Park, 20 March 1954, H. V. Weems, Jr. (FSCA); 1♀, Venus, 4 May 1961, H. V. Weems (FSCA); Marion Co., 1♀, 10 May 1956, H. V.



Fig. 8. *Rhyosphora robusta*: 8. Distribution map.

Weems (FSCA); Putnam Co., 1 ♀, Crescent City, IV. 20. 08., VanDuzee Coll. (AMNH). Maine: Hancock Co., 1 ♂, Bar Harbor, 5 July 1930, C. W. Johnson (USNM). Maryland: Prince Georges Co., 1 ♂, Hyatsville, 1 September 1912, Knab and Malloch (USNM). Massachusetts: Barnstable Co., 2 ♂ ♂, Pocasset, 26 July 1950, A. H. Sturtevant (USNM); Plymouth Co., 1 ♂, Rochester, 21 July 1950, A. H. Sturtevant (USNM). Michigan: Mecosta Co., 1 ♀, 24 July 1946, R. R. Dreisbach (USNM). New Hampshire: Ceshire Co., 1 ♂, 2 ♀ ♀, Keene, 4 August 1956, A. H. Sturtevant (USNM). New Jersey: Burlington Co., 1 ♂, Riverton, August 1917, C. W. Johnson (USNM). New York: Richmond Co., 1 ♂, Staten Island, 1923 (USNM); Suffolk Co., Long Island 4 ♀ ♀, Riverhead, 16 June 1951, Roy Latham (USNM); 1 ♀, Orient, 2 September 1954, Roy Latham (USNM); 1 ♂, Montauk, 11 September 1953, Roy Latham (USNM). Texas: Bastrop Co., 1 ♂, 1 ♀, Bastrop, 11 May 1954, L. D. Beamer (USNM). Virginia: Fairfax Co., 1 ♀, Alexandria,



29 June 1952, W. W. Wirth (USNM); 1♂, 1♀, Dyke, 16 July 1916, W. L. McAtee (USNM); 1♂, Mt. Vernon, 27 June 1915, W. L. McAtee (USNM).

*Geographic distribution.*—*Rhysophora robusta* occurs primarily along the Atlantic and Gulf coasts of North America but also extends to Quebec and Michigan (Fig. 8). I suspect that its distribution will be found to broadly coincide with that of Pickerel-weed.

*Natural history.*—Several specimens, including the type-series, were collected from aquatic habitats where Pickerel-weed (*Pontederia cordata* L.) grows abundantly. Label data accompanying many adult specimens indicate that they were specifically associated with the inflorescence of these plants. Pickerel-weed as a semiaquatic plant which occurs in shallow, quiet water or along muddy banks. Its distribution ranges from Nova Scotia to Ontario and southward through Minnesota to Texas and Florida.

*Variation.*—Color differences in the tarsi appear to be sexually dimorphic. The tarsi of males are concolorous, dark brown to brownish orange; the dorsal surfaces are usually darker. The fore tarsi of female specimens are similar in color to those of males but the mid and hind tarsi are much paler, yellowish orange. A single female from Florida, Highlands Hammock State Park (USNM) had hind and mid tarsi that are dark like the fore tarsi. Possibly this specimen represents a distinct species but because no other differences were noted and because associated males are presently unavailable, I have not recognized it as such.

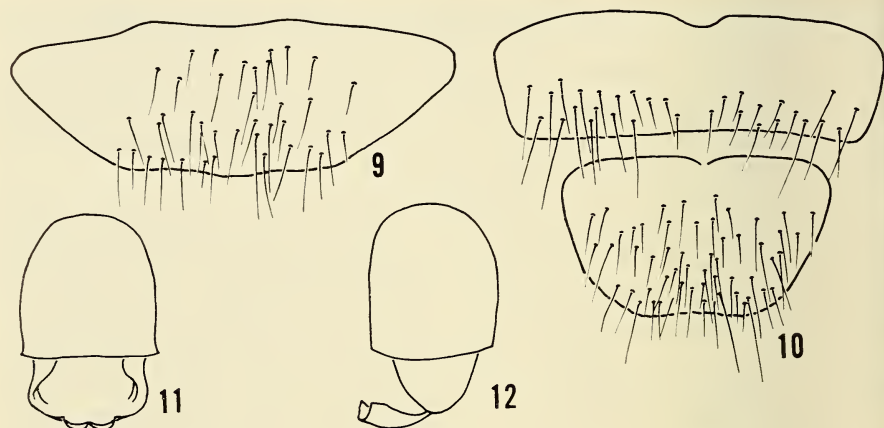
*Rhysophora liropus* Mathis, new species

Figs. 10–17

*Diagnosis.*—This species and *R. robusta* are closely related. Members of either species are distinguished by the characters listed in the key.

*Description.*—Medium-sized to moderately large shore flies, length 3.69–4.20 mm; generally lightly grayish in color.

*Head* (Figs. 13, 14).—Frons width-to-length ratio averaging 1:0.64; parafrons charcoal brown, semi-velvety; mesofrons more or less triangular in shape, anterior apex bluntly rounded, usually not reaching anterior margin of frons; mesofrons and fronto-orbit similar, grayish brown; ocelli arranged in equilateral triangle; larger postocellar bristles less than half length of ocellar bristles, inserted posterior of alignment of posterior ocelli; outer vertical bristle less than half length of inner vertical; smaller, posterior, proclinate fronto-orbital seta inserted about equidistant between anterior proclinate and reclinate bristles; fronto-orbit wide, greatest width equal to outside dimension length between ocelli. First and second antennal segments concolorous, more or less similar to parafrons color; third segment pale, yellowish orange basally, becoming darker, more brownish apically; length of third segment as long or longer than combined length of first 2 segments. Face grayish-golden in color, unicolorous; height-to-width ratio averaging

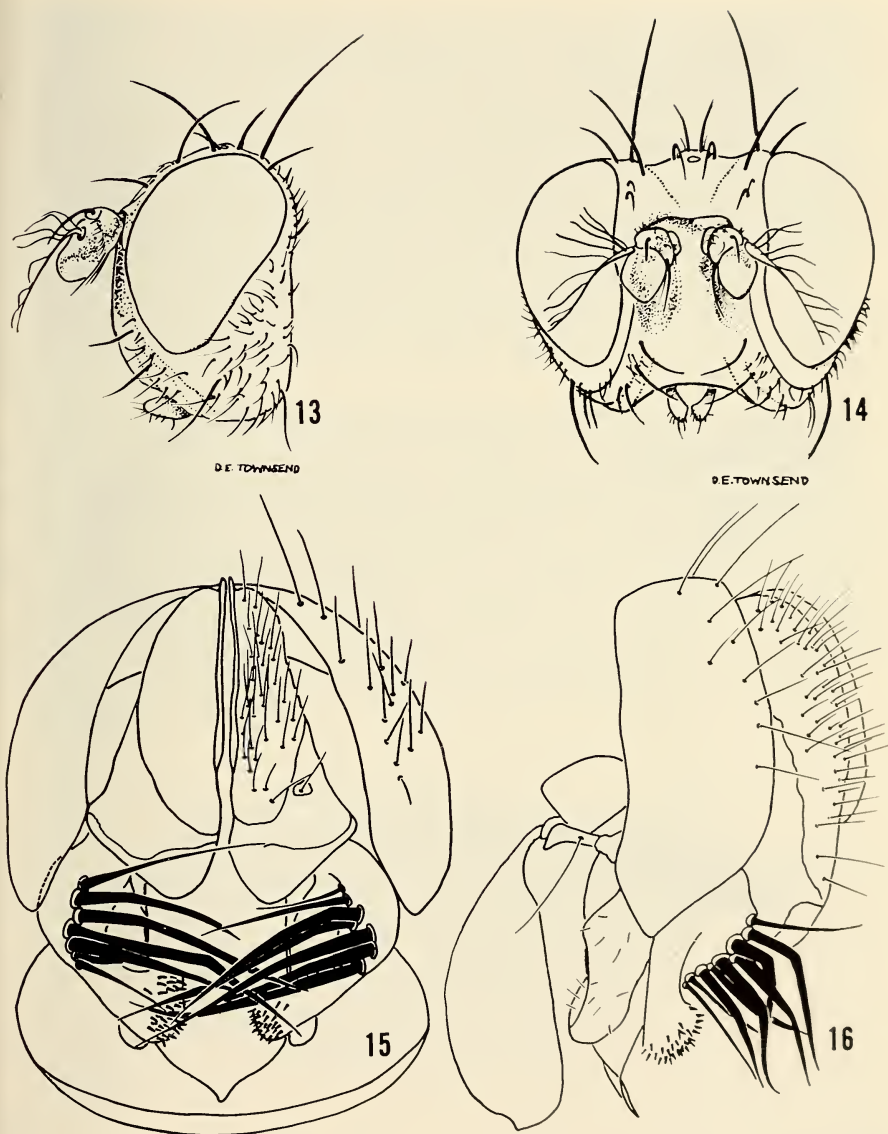


Figs. 9-12. *Rhyssophora robusta*: 9. Eighth sternum of female, ventral view. *Rhyssophora liropus*: 10. Seventh and eighth sterna of female, ventral view; 11. Female ventral receptacle, frontal view; 12. Same, lateral view.

1:0.85; antennal fovea not deeply impressed but evident; vertical, interfoveal carina poorly defined laterally, broad, surface extending ventrally without change of contour; facial bristles numbering 2, occasionally 3, converging and with 3-4 smaller setae ventrally; ventral margin of face broad, more or less evenly convex, sometimes angulate; parafacial width remaining even on upper half, becoming considerably wider ventrally, especially below eye. Eye height-to-width ratio averaging 1:0.76; gena high, eye-to-cheek ratio averaging 1:0.24, genal coloration similar to face, becoming slightly grayer posteriorly; maxillary palp pale, yellowish brown apically.

*Thorax*.—Generally grayish-brown; mesonotum brown but with gray vittae along dorsocentral tract and a slight indication of a median one; scutellum sparsely setulose posteriorly with only 1 lateral seta between larger bristles; pleural areas generally more grayish, especially fore coxa, pteropleuron, and hypopleuron. Femora and tibiae concolorous, grayish to blackish brown; tarsomeres all pale, yellowish orange, except dark brown apical tarsomer. Wing (Fig. 17) transparent, immaculate, tinged with yellowish coloration; wing length-to-width ratio averaging 1:0.42; costal vein index averaging 1:0.53;  $M_{1+2}$  vein averaging 1:0.90; anal wing angle ratio averaging 1:0.31.

*Abdomen*.—Generally grayish to olivaceous brown, posterior segments with faint evidence of darker brown fascia toward anterior margin. Eighth sternum of female (Fig. 10) not more than twice as wide as long. Male postabdomen (Figs. 15, 16) large, robust; surstylus well developed, larger bristles along posterolateral margin stout, long, conspicuous, many slightly

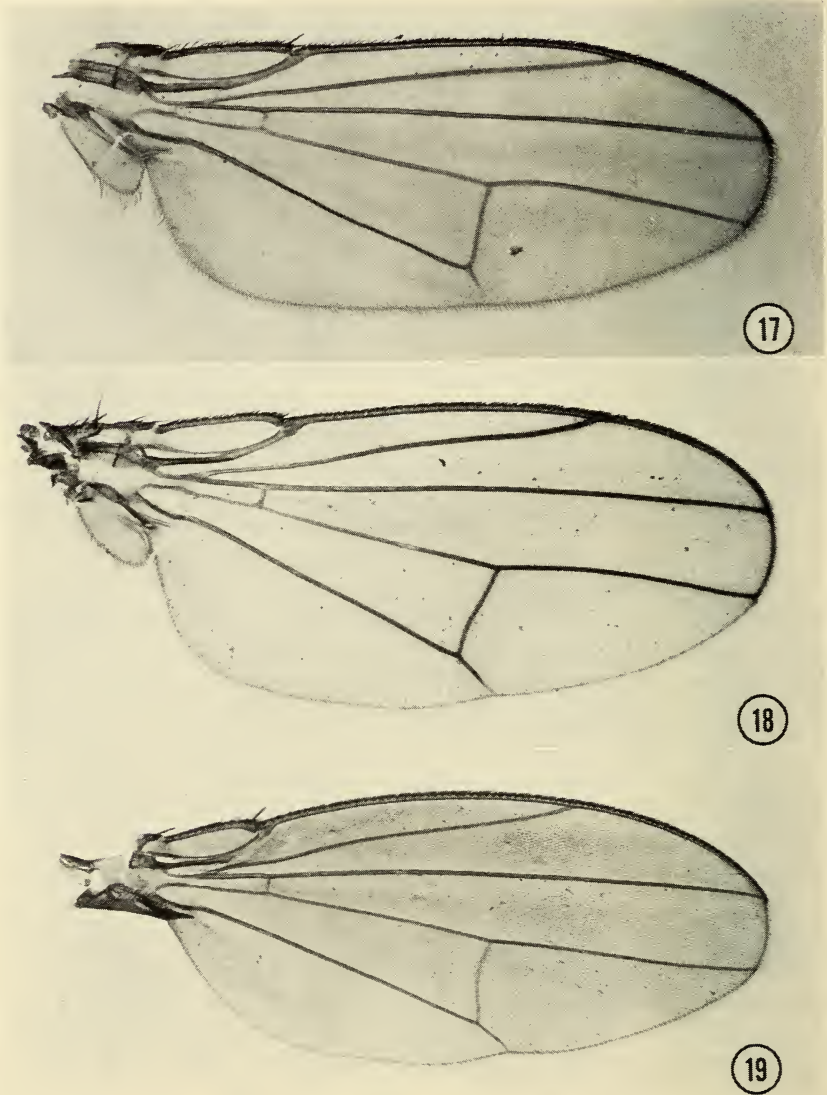


Figs. 13–16. *Rhyssophora liropus*: 13. Head, lateral view; 14. Same, frontal view; 15. Male genitalia, caudal view; 15. Same, lateral view.

angulate; anterior lobe of surstylus wide in profile, broadly rounded apically; aedeagus narrow, nearly twice as long as wide, ventral margin slightly napiform.

*Type-material*.—Holotype male, labelled: "ARGENTINA, Campana, 30.





Figs. 17-19. Wing. 17. *Rhysophora liropus*. 18. *Rhysophora robusta*. 19. *Rhysophora ardeoceras*.

X. 1974; Pontederia, Pl 13." Allotype female, labelled: "ARGENTINA, Dique Luján, 6 XI 1973; Pupas de Dique Lujan; Eichhornia azurea, Acc. Nov. 6. 73; A-348c." Other paratypes as follows: 1♂, "on Ponteria (sic) as pupa; ARGENTINA, Pcia. Bs. Aires, Campana, Frente all astillero, Nov. 5, 1973; A-361"; 1♂, (puparium pinned below adult specimen) "on Pontederia;

Parana R. Nr. Balneario Municipal, Campana, Argentina, Bs. As. Prov. Nov. 5. 73; Collectors H. A. Cordo; A-362." The holotype, allotype, and paratype are deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C., type number 75359.

*Etymology.*—*Liropus* is of Greek derivation and is a combination of the adjective *leiros* (Latin transcription *liros*), meaning "pale" or "bold" and the noun *pous* (Latin transcription *pus*), meaning "foot," in allusion to the pale tarsal coloration in specimens of this species. The name stands in apposition to the generic name.

*Geographic distribution.*—All of the specimens I examined were collected near the confluence of the Paraná and Uruguay rivers in the Province of Buenos Aires, Argentina. The localities are situated at about 34° south latitude.

*Natural history.*—The type-specimens were collected by Hugo A. Cordo in conjunction with efforts to find biological control agents for aquatic weed pests. At least one of the specimens was reared from plants of the genus *Pontederia* L.; and two others were associated with other plants of that genus. The allotype was collected in association with *Eichhornia azurea* (Sw.) Kunth, another aquatic plant belonging to the family Pontederiaceae.

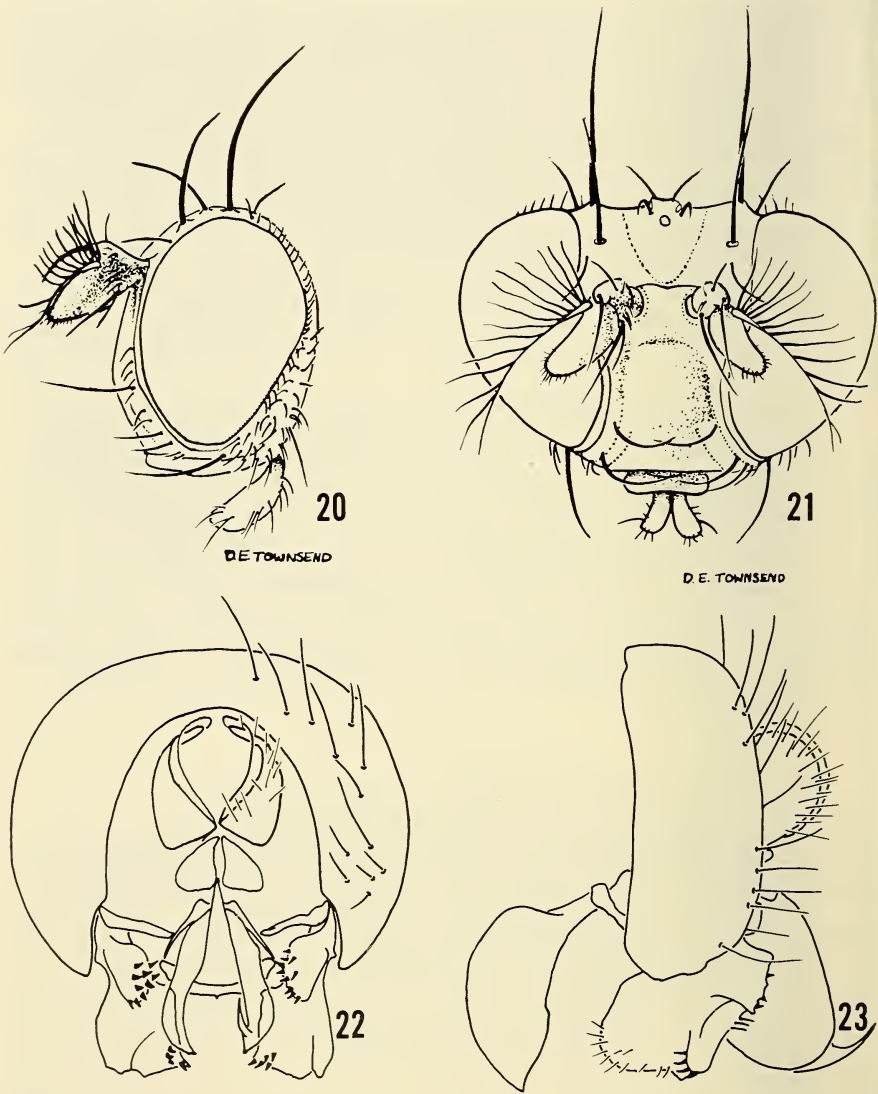
*Variation.*—The degree to which the mesonotal stripe is expressed varies considerably. In some specimens the stripe is barely evident while in others it is distinct, contrasting sharply with the paler background coloration.

### The *Ardeoceras* Group

Included Species: *R. ardeoceras*, new species

*Diagnosis.*—Frons width-to-length ratio approximately 1:0.75; length of outer vertical bristle approximately one-third that of larger, inner vertical; second antennal segment with larger setae much longer than width of segment; third antennal segment much longer than greatest width, dorsal and ventral edges tapering to acutely rounded apex; arisal branches 11-14; antennal fovea indistinct or absent; interfoveal carina lacking; ventral margin of face level with remainder of epistoma; larger facial setae number 2, dorsal pair crucinate; vein  $R_1$  merging with costa at level of anterior crossvein; anal wing angle only slightly projecting, broadly rounded, lacking angulate conformation; posterior marginal setae of fourth and fifth abdominal segments much larger than comparable setae of other segments and orientated at dorsoblique angle to plane of abdominal surface; fourth abdominal sternum of male with median, oval, membraneous area; aedeagus bilobed, left lobe with acutely pointed, spinelike processes, asymmetrical.

*Geographic distribution and natural history.*—See discussion under the only included species.



Figs. 20–23. *Rhyosphora ardeoceras*: 20. Head, lateral view; 21. Same, frontal view; 22. Male genitalia, caudal view; 23. Same, lateral view.

*Rhyosphora ardeoceras* Mathis, new species

Figs. 19–28

*Diagnosis*.—Members of this species are distinguished as outlined in the species-group diagnosis and by the character states cited in the key.

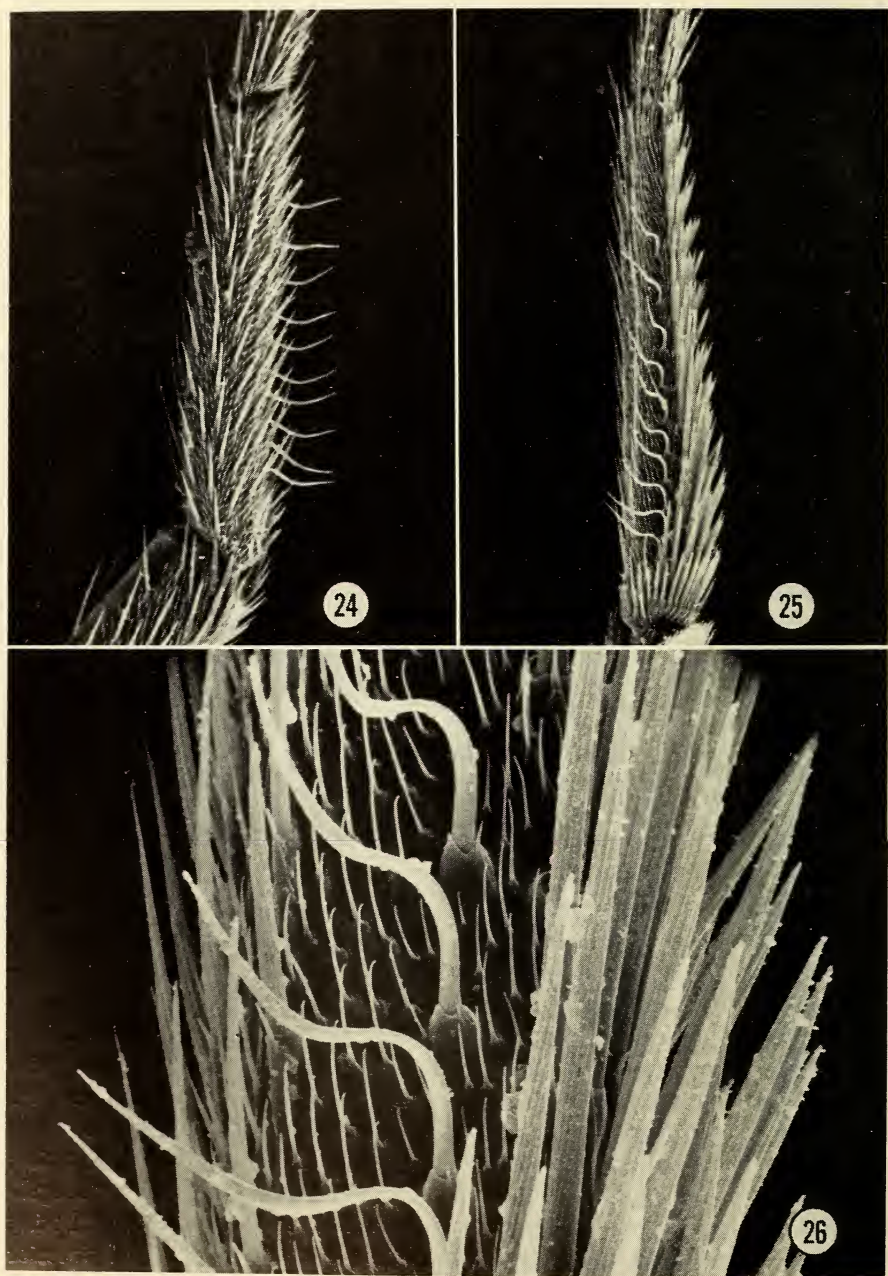


*Description*.—Moderately small to medium-sized shore flies, length 2.68–3.53 mm; general coloration black with paler extremities.

*Head*.—Frons width-to-length ratio averaging 1:0.74; mesofrons and fronto-orbit concolorous, subshiny, black; mesofrons broadly triangular, anterior apex broadly reaching anterior margin; parafrons black, semivelvety; fronto-orbit wide (Figs. 20, 21), equal to outside distance between ocelli; ocelli arranged in equilateral triangle; postocellars divergent, basal insertions aligned with posterior margin of posterior ocelli; outer vertical bristle small, about one-third length of inner vertical; posterior proclinate fronto-orbital seta, if present, small, inserted about equidistant between anterior proclinate and reclinate bristles. First and second antennal segments concolorous, black, pollinose; second segment bearing 1 larger dorsal and ventral bristle in addition to several smaller setae, larger ventral bristle much longer than greatest width of second segment; third antennal segment approximately  $2\frac{1}{2}$  times longer than its greatest width, tapering to acutely rounded apex, posteroventral portion pale, yellowish orange, remainder black; arista with 11–14 branches. Face height-to-width ratio averaging 1:0.53; background color black, pollinose, grayish brown dorsally, becoming argenteous ventrally; antennal fovea inconspicuous or lacking; interfoveal carina lacking; face more or less evenly convex in profile; lower portion of face lacking rugose sculpturing; ventral facial margin level with remainder of epistoma; 2 larger facial bristles; dorsal facial pair of bristles larger, cruciate, inserted just below middle of face; second facial pair of bristles convergent, inserted at ventral eye margin level; parafacies narrow except for slight expansion along ventral margin of eye. Eye height-to-width ratio averaging 1:0.70; gena short, eye-to-cheek ratio averaging 1:0.11, concolorous with face.

*Thorax*.—Generally black, subshiny; dorsum subshiny to shiny anteriorly, becoming pollinose with brownish vestiture posteriorly; disc of scutellum flat, sparsely setulose dorsally, with 1 small, lateral seta between larger bristles; pleural areas not as pollinose as mesonotum, more or less unicolorous. Femora and tibiae all black, lightly pollinose; tarsi with at least middle 2–3 tarsomeres pale, yellowish orange, apical tarsomer dark and base of basitarsis frequently becoming darker. Hind basitarsis of male with ventral, longitudinal depression from which a distinctive row of recurved setae arise; depression with uniformly-scattered, smaller setae on either side of larger setae (Figs. 24–26). Wing (Fig. 19) infumated, yellowish; costal margin bearing short, black setae until junction of  $R_{3+4}$ ; wing length-to-width ratio averaging 1:0.53;  $M_{1+2}$  vein index averaging 1:0.90; anal wing angle ratio averaging 1:0.31;  $R_1$  merging with costa at level of anterior cross-vein.

*Abdomen*.—Generally black, lightly pollinose, subshiny, evenly setulose except along posterior margins where setae are slightly larger; marginal pos-



Figs. 24-26. *Rhyssophora ardeoceras*: 24. Hind basitarsus of male, lateral view; 25. Same, ventral view; 26. Same, close-up.

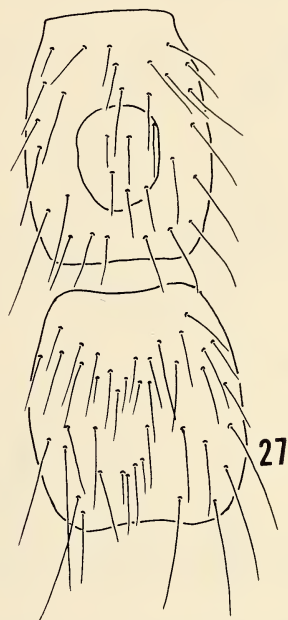


Fig. 27. *Rhysophora ardeoceras*: 27. Fourth and fifth abdominal sterna of male, ventral view.

terior setae of fourth and fifth abdominal segments conspicuously larger, with oblique-dorsal orientation. Fourth sternum of male (Fig. 27) with median, oval, membraneous area; male genitalia (Figs. 22, 23) with surstyli robust, bearing some spinules; aedeagus bilobed, left lobe bearing a spinelike, acutely-pointed process.

*Type-material*.—Holotype male, labelled: "COSTA RICA: Guanacaste Prov. 14kmNE Tilaran, 05 June 1973; Erwin & Hevel, Central American Expedition, 1973." Allotype and 1 male paratype with same label data as holotype. Other paratypes as follows: MEXICO: 1♂, Tepic, 2 July 1956, R. & R. Dreisbach; 1♀, Jalisco, Barranquillas, 3 February 1964, E. I. Schlinger. EL SALVADOR: 1♂, Santa Tecla (Nueva San Salvador), 12 km NW, October, 1953, W. B. Heed. COLOMBIA: 2♀♀, Buenaventura, 2 November 1950, Michelbacher and Ross. SURINAM: 1♀, Paramaribo, February, 1968, F. D. Bennett and H. Zwolfer. The holotype is deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C., type number 75360.

*Etymology*.—*Ardeoceras* is of Greek derivation and is a combination of the nouns *ardis*, meaning "point of an arrow" and *ceras*, meaning "horn," in





Fig. 28. *Rhyssophora ardeoceras*: 28. Distribution map.

allusion to the long, pointed antennae of specimens of this species. The name stands in apposition to the generic name.

*Geographic distribution* (Fig. 28).—*Rhyssophora ardeoceras* occurs throughout Middle America and into northern South America between 20° north latitude and the Equator.

*Natural history*.—Gary Hevel (personal communication) collected the specimens of the primary type-series by sweeping vegetation in a roadside ditch.

#### Phylogenetic Considerations

The cladogram (Fig. 29) and accompanying list of character evidence (Table 1) summarize the relationships between the species of *Rhyssophora*.

The monophyly of *Rhyssophora* is confirmed by several synapomorphies (characters 1–4, the apomorphy of each, determined by ex-group comparison). None of these were used to characterize the genus in previous treatments, nor were other character states used which are unique to the genus as characterized above. Perhaps this is why Cresson (1946) conditionally placed *Psilopa umbrosa* Loew and *P. caeruleiventris* Loew in *Rhyssophora* when these two species could not be accommodated within other *Psilopine* genera. Now, the generic concept of *Rhyssophora* is more firmly established and Loew's *Psilopa* species have been removed (Mathis and Wirth, 1977).

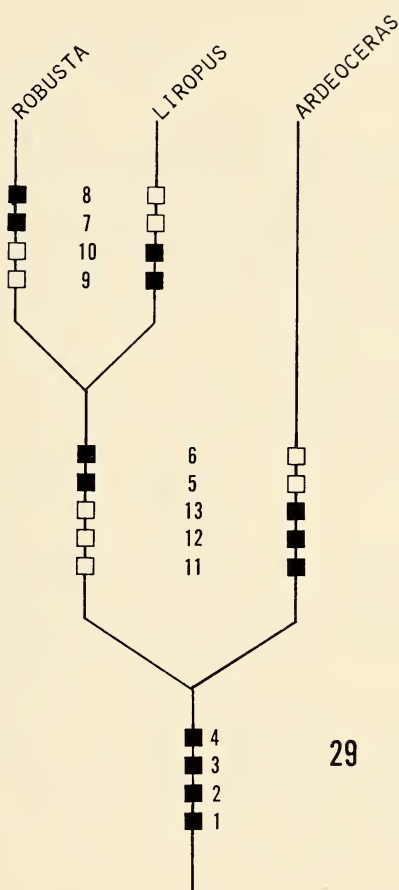


Fig. 29. Argumentation scheme for the hypothetical phylogeny of the genus *Rhyssophora*.

I recognize two species-groups in *Rhyssophora* despite the small number of known species. The groups are easily recognized and the monophyly of each is reasonably established as indicated in the cladogram (characters 5-6, 11-13).

The relationship of *Rhyssophora* to other ephydrid genera (mainly Psilopini) is not well understood. I have not been able to identify character states which would indicate a sister-group relationship with another genus or group of genera. Consequently, I have included in the key below those genera that are related patristically but whose cladistic relationships have not been clarified. These genera are recognized as follows:

Table 1. Characters and character states used in phyletic analysis of the species of *Rhyssophora*.

Character	Character States	
	plesiotypic	apotypic
1. Shape of hind basitarsus of male	similar to mid and fore basitarsi	swollen
2. Fringelike row of ciliate, pale setae along anteroventral surface of hind basitarsus of male	absent	present
3. Length of outer vertical bristle	equal to inner	one-half or less inner
4. Orientation of postocellar bristles	proclinate-divergent	divergent
5. Antennal fovea	shallowly impressed if evident	deeply impressed
6. Ventral facial margin	level with remainder of epistoma	broadly emarginate
7. Genal height	less than one-fifteenth eye height	averaging about one-fourth eye height
8. General coloration	black	grayish-brown
9. Coloration of tarsi	males and females similar	sexually dimorphic
10. Coloration of third antennal segment	posteroventral portion pale, yellowish orange, the remainder black	unicolorous, black
11. Shape of third antennal segment	bluntly rounded	acutely rounded
12. Fourth abdominal sternum of male	entirely sclerotized	median oval area membranous
13. Setal size and orientation along posterior margin of fourth abdominal segment	similar to second and third	larger and with dorsoblique orientation



1. Prescutellar acrostichal setae large, their insertions relatively separated, anterior of, or aligned with intra-alar setae.
2. Strong supra-alar seta present.
3. Specimens generally robust.
4. Thoracic vestiture usually dull, pollinose.

This assemblage of genera is intermediate between the tribes Discocerini and Psilopini as Cresson (1942) characterized them. In an earlier paper, Mathis and Wirth (1977) suggested that Discocerini and Psilopini, *sensu* Cresson (1942), should be combined in the absence of discrete, identifying character states. I have since studied these genera and now believe that Discocerini is a monophyletic assemblage if the genera included in the tribe are limited to those Cresson recognized in his various synopses (1942, 1945, 1946a, 1946b). The characters which establish the monophyly of Discocerini, however, were not used by Cresson (1942). These are:

1. Prescutellar setae small, inserted close together and behind or aligned with the intra-alar setae.
2. Mesopleuron lacking small, up-curved seta near the posterodorsal corner.
3. Reclinate fronto-orbital bristle inserted slightly anterior of larger, proclinate fronto-orbital as viewed from a lateral aspect.
4. Smaller proclinate fronto-orbital setae, if present, inserted anterior to larger proclinate bristles.

Genera included in Discocerini are: *Discocerina* Macquart, *Hydrochasma* Hendel, *Polytrichophora* Cresson, *Diclasioipa* Hendel, *Hecamedoides* Hendel, *Pectinifer* Cresson, and *Ditrichopora* Cresson.

This restricted concept of Discocerini leaves Psilopini with the genera Cresson normally included in that tribe, plus genera frequently included in Discocerini, i.e. *Hostis* Cresson and *Paratissa* Coquillett. Because I have not identified synapomorphic character states for Psilopini, it could be paraphyletic. Erecting a third tribe for the intermediate genera would partially alleviate the problem because the remaining psilopine genera lack a supra-alar bristle. However, this action would still leave the status of the third tribe unresolved.

Key to *Rhysophora* and Related Psilopine Genera with a  
Large Supra-alar Bristle and with Prescutellars Well Separated

- |  |   |
|--|---|
| 1. Vein $R_{2+3}$ basad of anterior crossvein with 3-4 setae above   | 2 |
| - Vein $R_{2+3}$ basad of anterior crossvein bare above  | 4 |
| 2. Arisal branches numbering 3-4; postocellar setae with proclinate-divergent orientation; wing hyaline or uniformly infumated; alula normal | 3 |
| - Arisal branches numbering 8-15; postocellar setae with latero-   |   |

- climate-divergent orientation; wing guttate, generally dark brown with white spots; alula reduced *Actocetor* Becker
3. Four fronto-orbital bristles, first 2 bristles proclinate, third latero-clinate, fourth lateroreclinate; 1 pair of infrafrontal bristles anterior of ocellar bristles *Paratissa* Coquillett
- Three fronto-orbital setae, first bristle proclinate, second reclinate, third proclinate; lacking intrafrontal bristles *Hostis* Cresson
4. Wing immaculate, hyaline or uniformly infumated; arisal branches numbering 8-14; thoracic coloration mostly black, subshiny to shiny; outer vertical bristle with length half or less that of outer vertical bristle; hind basitarsus of male swollen, bearing a row of fine, cilia-like, pale setae along anteroventral surface; postocellar setae latero-proclinate *Rhysophora* Cresson
- Wing with anterior margin darkened, usually brownish black or wing guttate, dark, brownish black with white spots; arisal branches numbering 4-6; thoracic coloration mostly dull, grayish-pollinose; hind basitarsus of male similar to mid and fore basitarsi, lacking row of cilia-like setae; postocellar seta with proclinate-divergent orientation
5. Wing guttate, dark, brownish black with white spots; costal vein index greater than 1:0.80 *Guttipsilopa* Wirth
- Wing darkened along anterior half, posterior half hyaline; costal vein index less than 1:0.60 *Nesopsilopa* Mathis and Wirth

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